

Appl. No. 10/629,374

Amdt. Dated August 18, 2005

Reply to Office Action of May 20, 2005

AMENDMENTS TO THE SEPCIFICATION

Please replace paragraph [0016] with the following amended paragraph:

[0016] Thermally conducting layer 48 is preferably but not essentially provided between PWB 42 and lower surface 22 of package 12, and upper surface 45 of heatsink 46. This is to avoid air bubbles bubbles or other interface anomalies that might increase the interfacial thermal impedance between lower surface 22 of package 12 and upper surface 45 of heatsink 46. Thermally conductive layer 48 should be resilient (e.g., thermally conductive rubber) and as thin as possible consistent with any requirement that it also be electrically insulating. When layer 48 is omitted, any exposed leads on lower surface 43 of PWB 42 need to be covered with an electrical insulating layer or, alternatively, upper surface 45 of heatsink 46 should have an insulating layer thereon. For aluminum heatsinks, an aluminum oxide layer or oxide containing paints are examples of useful thermally conductive but electrically insulating layers. Heatsink 46 is conveniently made of extruded aluminum but other thermally conductive materials may also be used. Because upper surface 45 need not have any special machining or other features, low cost standard heatsinks may be used. This is a significant advantage. Gap Pad A3000 manufactured by the Berquist Company, Chanhassen, MN, is an example of a suitable material for thermally conductive layer 48. In a preferred embodiment of the present invention, layer 48 of this material having a thickness of 0.020 inches (0.5 mm) was suitable, but thicker or thinner layers can also be used depending upon the choice of electronic device(s) and the heatsink. The assembly of PWB 42, layer 48 and heatsink 46 is conveniently held together with screws (e.g., see FIG. 4), rivets, clamps or equivalent so that leads 14-15 and lower surface 22 of device body surface 12 are firmly pressed against layer 48 and underlying heatsink 46. It will be noted that with the arrangement of the present invention, leads 14-15 are clamped between PWB 42 and layer 48 and underlying heatsink 46. This is a significant advantage because: (1) it produces a much more rugged structure, and (2) it improves the thermal coupling of device 20 to heatsink 46. Persons of skill ~~in the~~ in the art will appreciate that leads 14-15 are important thermal pathways through which heat may be removed from device 10 and that the present

Appl. No. 10/629,374

Amdt. Dated August 18, 2005

Reply to Office Action of May 20, 2005

arrangement provides much better thermal coupling of leads 14-15 to heatsink 46 than the prior art arrangement of FIGS. 2A-B.